

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re:	Dale C. Flanders <i>et al.</i>	Confirmation No:	4350
Application No:	09/645,827	Group:	1793
Filed:	August 25, 2000	Examiner:	Aboagye, Michael
For:	Optical System Production System		
Customer No.:	25263		
Attorney Docket No.	1000.0006		

### **THIRD APPELLANTS' BRIEF**

#### **Commissioner for Patents**

P.O. Box 1450,  
Alexandria, Virginia 22313-1450

Sir:

This is the Applicants' appeal from the Office Action, mailed January 22, 2009  
(Paper No. 20090109).

#### **Real Party in Interest**

Axsun Technologies, Inc. is the real party in interest. Axsun Technologies, Inc. is owned by Volcano Corporation of San Diego, California.

#### **Related Appeals and Interferences**

There are no related appeals or interferences.

#### **Status of Claims**

Claims 1, 3-8, 17, 19, and 20 are pending in this application. Claims 2, 9-16 and 18 are cancelled. Claims 1, 3-8, 17, 19, and 20 are rejected. The rejection of claims 1, 3-8, 17, 19, and 20 is being hereby appealed.

## **Status of Amendments**

All amendments have been entered. There were no post final amendments or proposed amendments.

## **Summary of Claimed Subject Matter**

Claim 1 concerns an optical system production line, comprising  
an optical bench supply that provides optical benches (see specification at page 25, line 19, and Fig. 26, reference numeral 2018);  
a component supply that provides mounting structures holding optical components (see specification at page 25, line 5, and Fig. 26, reference numerals 2010, 2012);  
a pick-and-place machine that receives optical benches from the bench supply, picks optical components from the optical component supply, and solder bonds the mounting structures, holding the optical components, to the optical benches (see specification at page 25, line 8, and Fig. 26, reference numeral 2014); and  
optical system aligner that characterizes the positions of the optical components held by the mounting structures, which have been solder bonded to the optical benches by the pick-and-place machine, and mechanically adjusts the relative positions of the optical components by plastically deforming the mounting structures, which have been bonded to the optical benches by the pick-and-place machine (see specification at page 25, line 26, and Fig. 26, reference numeral 2020).

Claim 17 concerns an optical system production line, comprising  
an optical bench supply for providing optical benches (see specification at page 25, line 19, and Fig. 26, reference numeral 2018);  
a component supply for providing mounting structures holding optical components (see specification at page 25, line 5, and Fig. 26, reference numerals 2010, 2012);

a pick-and-place machine for receiving optical benches from the bench supply, and for picking optical components from the optical component supply, and for solder bonding mounting structures of the optical components to the optical benches (see specification at page 25, line 8, and Fig. 26, reference numeral 2014); and  
means for characterizing the positions of the optical components held by the mounting structures, which have been solder bonded to the optical benches by the pick-and-place machine, and for mechanically adjusting the relative positions of the optical components by plastically deforming the mounting structures that have been bonded to the benches by the pick-and-place machine (corresponds to optical system aligner or alignment system 2020, see specification at page 25, line 26, and Fig. 26, reference numeral 2020).

### **Grounds of Rejection to be Reviewed on Appeal**

Whether claims 1, 3-8, 17, 19 and 20 are unpatentable under 35 U.S.C. 103(a) over SPIE Vol. 2906, Microrobotics: Components and applications (hereinafter Wolfgang) in view of Kang *et al.* (US Patent No. 6,087,621, hereinafter Kang).

### **Argument**

It is well settled that the Examiner bears the initial burden of establishing a prima facie case. In re Oetiker, 977 F.2d 1443, 1445 (Fed. Cir. 1992). To establish a prima facie case of obviousness, all the claim features must be taught by the prior art. In re Royka, 490 F.2d 981, 985 (CCPA 1974). If examination at the initial stage does not produce a prima facie case of unpatentability, then without more the applicant is entitled to a grant of the patent. Oetiker, 977 F.2d at 1445.

Claims 1, 3-8, 17, 19 and 20 are patentable over Wolfgang and Kang

Claim 1 and 17 are distinguishable over the combination of Wolfgang and Kang. Neither Wolfgang nor Kang shows nor suggests the use of a pick-and-place machine for solder bonding mounting structures to the benches.

Wolfgang discloses a system in which the UTH's are placed on a bench with a robot gripper, as illustrated in its Fig. 8A. The UTH's are then fine positioned until they are properly aligned in the optical link. See Fig. 8B of Wolfgang. Only then are the UTH's attached to the optical bench via laser welding as shown in the Fig. 8C of Wolfgang.

The pending Office Action concedes the defect in Wolfgang on the point of solder bonding at page 4:

**Wolfgang teaches the pick-and-place machine performing laser welding to bond the mounting structures to the benches but is silent on the pick-and-place machine performing solder bonding. However, solder bonding using a laser beam is known in the**

Likewise, Kang uses laser welding as conceded by the pending Office Action at page 5:

**Kang et al. provides the general teaching of it being known in the art that the phenomenon often referred to as the post weld shift (PWS) due to solidification shrinkage of the metal, when an optical component (optical fiber ferrule , 110, figure 5) positioned in a mounting structure (optical fiber support, 120, figure 5) is bonded (laser welded) to an optical bench (submodule substrate 140, figure 5), resulting in a weld**

In summary, the present claims require a pick-and-place machine that solder bonds mounting structures to optical benches. Both of the applied references teach the use of laser welding.

The advantage of the present invention relative to the systems disclosed in Wolfgang and Kang is 1) expensive laser welding systems with the expensive laser

welders and 2) the need for direct free-space paths to the laser weld locations for the laser beams are avoided. Instead pick and place machines, such as flip-chip bonders, can be used.

For these reasons, withdrawal of this rejection is warranted since there is no prima facie obviousness.

For the foregoing reasons, Applicants believe that the pending rejections should be withdrawn, and that the present application should be passed to issue. Should any questions arise, please contact the undersigned.

Respectfully submitted,

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## Claims Appendix

1. (Previously presented) An optical system production line, comprising  
an optical bench supply that provides optical benches;  
a component supply that provides mounting structures holding optical  
components;  
a pick-and-place machine that receives optical benches from the bench supply,  
picks optical components from the optical component supply, and solder  
bonds the mounting structures, holding the optical components, to the  
optical benches; and  
optical system aligner that characterizes the positions of the optical  
components held by the mounting structures, which have been solder  
bonded to the optical benches by the pick-and-place machine, and  
mechanically adjusts the relative positions of the optical components by  
plastically deforming the mounting structures, which have been bonded to  
the optical benches by the pick-and-place machine.
2. (Cancelled)
3. (Previously presented) An optical system production line as claimed in claim  
1, wherein the optical system aligner characterizes the positions of the optical  
components by activating optical links of optical systems on the benches,  
detecting optical signals after interaction with at least some of the optical  
components and adjusts the optical components to optimize transmission of  
optical signals over the links.
4. (Previously presented) An optical system production line as claimed in claim  
1, wherein the optical system aligner energizes active components of optical  
systems on the benches and adjusts the optical components, which have been

bonded to the optical benches by the pick-and-place machine, to optimize optical signal transmission through the systems from the active optical components.

5. (Previously presented) An optical system production line as claimed in claim 1, wherein the optical system aligner energizes active components of optical systems and adjusts positions of at least one passive optical component, which have been bonded to the optical benches by the pick-and-place machine, in each of the optical systems to optimize optical signal transmission from the active components to the at least one passive component.

6. (Previously presented) An optical system production line as claimed in claim 1, wherein the optical system aligner energizes active components of optical systems and adjusts positions of at least two passive optical components, which have been bonded to the optical benches by the pick-and-place machine, in each of the optical systems to optimize optical signal transmission between the passive components.

7. (Original) An optical system production line as claimed in claim 1, wherein the pick and place machine is a flip-chip bonder.

8. (Previously presented) An optical system production line as claimed in claim 1, wherein the optical system aligner comprises two jaws for engaging the mounting structures, which has been bonded to the optical benches by the pick-and-place machine, supporting the optical component and moving the structures relative to the bench.

Claims 9.-16. (Cancelled)

17. (Previously presented) An optical system production line, comprising  
an optical bench supply for providing optical benches;  
a component supply for providing mounting structures holding optical components;

a pick-and-place machine for receiving optical benches from the bench supply, and for picking optical components from the optical component supply, and for solder bonding mounting structures of the optical components to the optical benches; and  
means for characterizing the positions of the optical components held by the mounting structures, which have been solder bonded to the optical benches by the pick-and-place machine, and for mechanically adjusting the relative positions of the optical components by plastically deforming the mounting structures that have been bonded to the benches by the pick-and-place machine.

18. (Cancelled)

19. (Previously presented) An optical system production line as claimed in claim 17, further comprising the characterizing and adjusting means characterizing the positions of the optical components by activating optical links of optical systems on the benches, detecting optical signals after interaction with at least some of the optical components, and adjusting the optical components, which have been bonded to the optical benches by the pick-and-place machine, to optimize transmission of optical signals over the links.

20. (Previously presented) An optical system production line as claimed in claim 17, further comprising the characterizing and adjusting means energizing active components of optical systems and adjusting positions of at least one passive optical component, which has been bonded to the optical benches via a mounting structure by the pick-and-place machine, in each of the optical systems to optimize optical signal transmission from the active components to the at least one passive component.

## **Evidence Appendix**

None

## **Related Proceedings Appendix**

None